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FCMSA Intervention Model - Executive Summary

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Executive Summary

Brief Description

The Roadside Inspection and Traffic Enforcement programs are two of the Federal Motor Carrier Safety Administration's (FMCSA) key safety programs. The Roadside Inspection program consists of roadside inspections performed by qualified safety inspectors following the guidelines of the North American Standard, which were developed by FMCSA and the Commercial Vehicle Safety Alliance. Most roadside inspections are conducted by the States under the Motor Carrier Safety Assistance Program (MCSAP). There are six levels of inspections that include a vehicle component, a driver component, or both. The Traffic Enforcement program is composed of two distinct activities: a traffic stop as a result of a moving violation and a roadside inspection.

FMCSA, in cooperation with the Volpe National Transportation Systems Center, has developed an analytic model to measure the effectiveness of roadside inspections and traffic enforcements in terms of crashes avoided, injuries avoided, and lives saved. Traffic enforcements and roadside inspections are considered interventions and this analytic model is known as the Intervention Model. This model provides FMCSA management with information to address the requirements of the Government Performance and Results Act of 1993 (GPRA), which obligates Federal agencies to measure the effectiveness of their programs as part of the budget cycle process. It also provides FMCSA and State safety program managers with a quantitative basis for optimizing the allocation of safety resources in the field.

The Intervention Model is based on the premise that interventions to correct vehicle and driver defects directly and indirectly contribute to a reduction in crashes. The model includes two submodels that are used for measuring these different effects:

- Direct effects are based on the assumption that vehicle and/or driver defects discovered and then corrected as the result of interventions reduce the probability that these vehicles/drivers will be involved in subsequent crashes. The model calculates direct-effect-prevented crashes according to the number and type of violations detected and corrected during an intervention.
- Indirect effects are the by-products of the carriers' increased awareness of FMCSA programs and the potential consequences that the programs could impose if steps are not taken to ensure and/or maintain higher levels of safety. In order to measure indirect effects, which are essentially changes in behavior involving driver preparation, practices and vehicle maintenance, the model calculates responses to exposure to the programs and the resulting reduction in potentially crash-causing violations.

This model, which measures the effectiveness of the roadside inspection and traffic enforcement programs, when combined with the Compliance Review Effectiveness Model, forms a powerful performance measurement capability that plays a significant role in resource allocation decisions regarding FMCSA's safety programs.

Methodology

This model is based on the premise that the two programs - Roadside Inspection and Traffic Enforcement - directly and indirectly contribute to the reduction of crashes. As a result, the model includes two submodels that are used for measuring these different effects. Direct effects are based on the assumption that vehicle and/or driver defects discovered and then corrected as the results of interventions (roadside inspections and traffic enforcements) reduce the probability that these vehicles/drivers will be involved in subsequent crashes. Indirect effects are considered to be the by-products of the carriers' increased awareness of FMCSA programs and the potential consequences that these programs pose if steps are not taken to ensure and/or maintain high levels of safety. Figure ES-1 provides an overview of the Intervention Model.

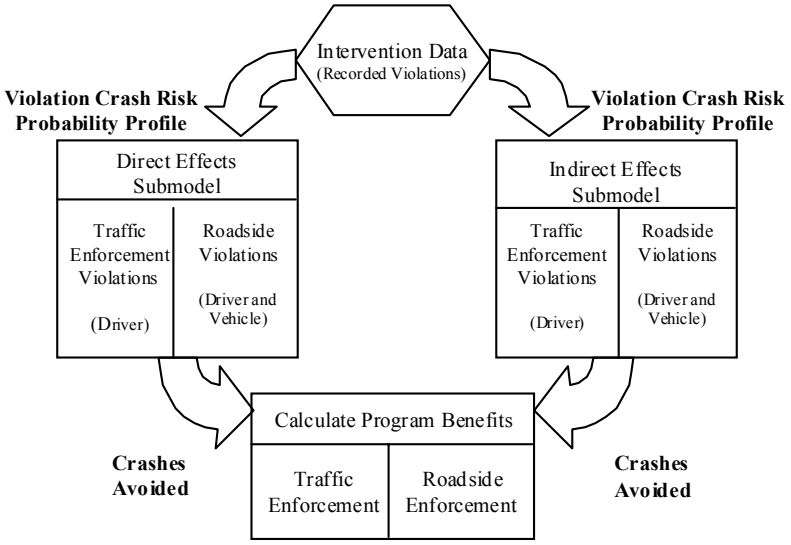

Figure ES-1. Overview of the Intervention Model

Direct Effects

This section describes the methodology employed to estimate the number of direct-effect crashes avoided.

Conceptually, the approach at the heart of the Direct Effects Submodel is straightforward. Since the occurrence of a single violation implies a certain degree of crash risk, each inspection that uncovers at least one violation can be interpreted as having reduced the risk linked with its noted violation(s). The model expresses this risk reduction in terms of the likelihood of a crash being avoided by each inspection violation that was noted and corrected. For an individual intervention, the avoided crash probability will be dependent upon the number and type of violations. Multiple violations

will have a compounding effect, thereby increasing the likelihood of a prevented crash. By accounting separately for the two types of violations (roadside and traffic enforcement) and summing the portions of crashes avoided for all inspections within each group, it is possible to estimate direct-effect crashes that have been avoided due to the programs. The Direct Effects Submodel is composed of three major steps:

- Input Data Selection
- Assignment of Crash Risk Probabilities
- Calculation of Direct Results

Input Data Selection. One year of intervention data is extracted from the Motor Carrier Management Information System (MCMIS) database. This database contains roadside inspection and traffic enforcement information compiled from federal and state safety agencies. This data also includes the violations (if any) that were cited during the intervention. While interventions are not required to have violations associated with them, in practice about 75% of all interventions do have one or more violations.

This violation data is the key component in the model as it represents the defects that were identified and corrected as a part of the program. This data is also used in the determination of which interventions were conducted under the Traffic Enforcement Program (i.e. traffic enforcements) and which were conducted under the Roadside Inspection Program. An inspection with a traffic enforcement driver violation is classified as traffic enforcement with a driver and/or vehicle roadside inspection component(s). All other inspections are classified as entirely driver and/or vehicle roadside inspections.

Assignment of Crash Risk Probabilities. In the model, the assumption is made that observed deficiencies (i.e. violations) discovered at the time of the intervention can be converted into crash risk probabilities. This assumption is based on the premise that detected defects represent varying degrees of mechanical or judgmental faults, and, further, that some are more likely than others to play a contributory role in motor carrier crashes. The assumption is that these deficiencies can be noted and ranked into discrete risk categories, each with a probability that quantifies the potential for a crash for all deficiencies in that category. The risk categories and their descriptions are as follows:

- Risk Category 1 - The violation is the potential single, immediate factor leading to a crash.
- Risk Category 2 - The violation is the potential single, eventual factor leading to a crash.
- Risk Category 3 - The violation is a potential contributing factor leading to a crash.
- Risk Category 4 - The violation is an unlikely potential contributing factor leading to a crash.
- Risk Category 5 - The violation has little or no connection to crashes.

The risk categories were designed such that each category represents a different order of magnitude of likelihood of contributing to a crash. Using this information and the latest available data, crash risk probabilities were developed for each risk category by out-of-service indicator and by violation type (driver or vehicle). Each probability is an estimate of the portion of a crash avoided when an inspection uncovers a particular violation or inversely the number of violations of that type that would need to be uncovered before one crash could be prevented.

Calculation of Direct Results. The likelihood of an avoided crash for each inspection is calculated by using the crash reduction probabilities of each of the violations cited during the inspection. An inspection with multiple violations will have a greater likelihood of an avoided crash than will an inspection with a single violation, assuming all the violations are in the same risk category. This result reflects the belief that multiple violations compound the safety hazard posed from driver deficiencies and/or vehicle defects.

Once the number of crashes avoided for each inspection has been calculated, the next step in the calculation of the results is to compute the number of lives saved and injuries avoided as a result of those crashes avoided. This is done by computing national averages of fatalities per crash and injuries per crash using MCMIS data. These averages are then multiplied by the number of crashes avoided resulting in the number of lives saved and injuries avoided.

Indirect Effects

The fundamental premise of the indirect-effects approach is that once carriers have been exposed to interventions, they will change their behavior. This change in behavior will result in higher levels of compliance, fewer future violations, and, therefore, a reduction in the number of crashes. This section presents a summary of the methods used in the model to arrive at program indirect effects. The deterrent-effects part of the model - that is, the Indirect Effects Submodel - follows a similar pattern to that of the Direct Effects Submodel.

Indirect effects, by their nature, defy measurement. However, changes in behavior represented by changes in the number of violations recorded for a carrier over time can be used to identify and evaluate the results of the indirect effects. In other words, if a carrier receives fewer and fewer violations as it is subjected to more inspections, it will be determined that compliance behavior has been affected and the resulting likelihood of crashes has been reduced. To measure these effects, multiple successive years of intervention data are required.

The Indirect Effects Submodel compares carrier performance in a base year to the year after in order to measure the effects of the exposure to interventions in the base year on compliance. What is sought is an improvement, i.e., a reduction, in the likelihood of a crash resulting from increasingly fewer violations being recorded. The difference between the totals is calculated as the indirect-effect crashes-avoided. Depending upon the initiating intervention, it is tallied as indirect-effect crashes avoided for either the roadside inspection or traffic enforcement programs. Figure ES-2 illustrates the processes involved in assessing the indirect effects of the model.

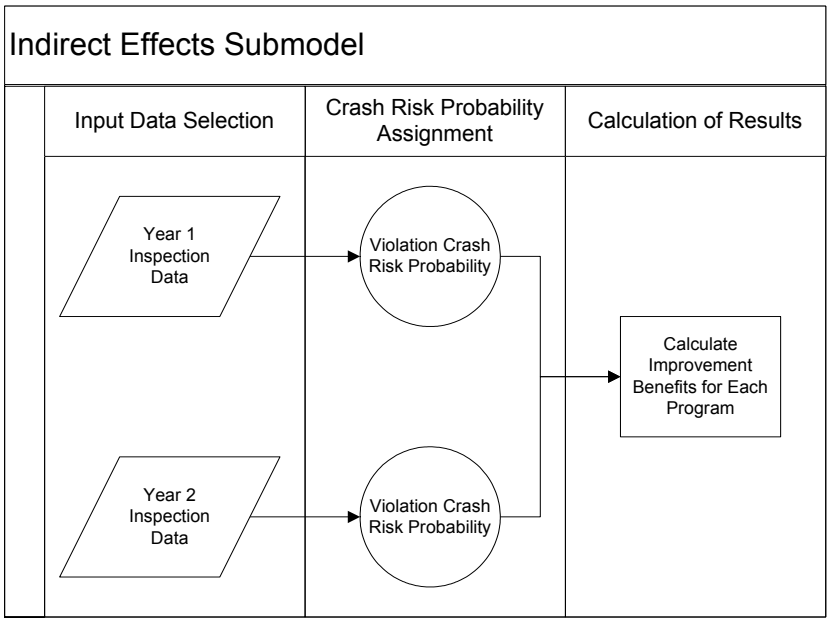

Figure ES-2. Indirect Effects Approach

Input Data Selection. Instead of one year of intervention data, like the Direct Effects Submodel, two years of intervention data are required. Again, this includes the interventions as well as any associated violations. The first year of data selected is the base year. This is the year in which the effectiveness of the interventions will be estimated. The second year is the year after the base year and is used for comparison purposes in order to determine the change in carrier performance.

Crash Risk Probability Assignment. In this step, the two years of intervention data is analyzed and the violations are assigned to their appropriate risk category using the same process described in the direct effects submodel description.

Calculation of Results. The crashes avoided are calculated for both years of data by carrier for each program using the same algorithm as the Direct Effects Model. This is where the two submodels diverge in their approach. A standard set of filtering criteria is used to eliminate carriers with insufficient data for a comparison. Once the filtering is complete, the difference between the crashes avoided estimated in the base year and the crashes avoided estimated in the subsequent year is computed for each carrier and program. These carrier-level results are then summed in order to arrive at program-level results for the difference in crashes from the base year to the subsequent year. This change in crashes is converted to a percentage difference then applied to the number of interventions conducted in the base year. The results of the computation are the estimated number of crashes avoided for each program. The determination of lives saved and injuries avoided is done in the exact same way as it was for the direct effects, that is national level fatalities and injuries per crash are used to estimate the lives saved and injuries avoided. The safety benefits estimated by this part of the model represent

the indirect effect of the intervention program activities conducted in the base year, which is the activity year that was used in the direct effects calculation.

The only drawback to this method of calculating the indirect effects is that it requires an additional year of data after the activity year. For example, in order to compute the indirect effects for the 2004 interventions, it would require 2005 intervention data as well. Instead of waiting until this data is available to release results, an average of the prior two years indirect effects benefits (as a percentage of the total benefits) are used to project the indirect effects.

2004 Intervention Model Results

The model was implemented to estimate the crashes avoided, lives saved, and injuries avoided as a result of activities performed during the 2004 calendar year. The direct effects were calculated exactly as described in the previous section. The indirect effects for each program were projected from the 2002 - 2003 indirect effects results. Over those two years the indirect effects on average accounted for 24% of the total Roadside Inspection Program benefits and 14% of the total Traffic Enforcement Program benefits. The direct and indirect results are combined and presented at two different levels, the national level and the state level.

National Level

Table ES-1 provides a comparison of the program activity level for the current analysis year (2004) as well as two historical years (2002 - 2003). While there has been some fluctuation from year to year, in general the activity levels of the two programs have remained relatively constant over the past few years.

Table ES-1. Program Exposure 2002 - 2004

	2002	2003	2004
Roadside Inspections	2,255,921	2,215,762	2,211,875
Traffic Enforcements	762,561	791,157	803,032
Total	*3,018,482*	*3,006,919*	*3,014,907*

Table ES-2 presents the benefits of the two programs in the current analysis year (2004) as well as two years of historical results.

Table ES-2. Program Effectiveness 2002 - 2004

	2002	2003	2004
Crashes Avoided			
Roadside Inspection	12,235	12,667	9,606
Traffic Enforcement	4,602	4,484	9,067
Total	*16,387*	*17,151*	*18,673*
Injuries Avoided			
Roadside Inspection	9,240	9,647	7,004

Table ES-2. Program Effectiveness 2002 - 2004

	2002	2003	2004
Traffic Enforcement	3,476	3,415	6,611
Total	*12,716*	*13,062*	*13,615*
Lives Saved			
Roadside Inspection	567	534	371
Traffic Enforcement	214	188	351
Total	*781*	*722*	*722*

For years 2002 and 2003, all benefits from driver and vehicle roadside inspections conducted in conjunction with traffic enforcements were allocated to the Roadside Inspection Program. For 2004, those benefits were instead allocated to the Traffic Enforcement Program, which explains the decrease in benefits for the Roadside Inspection Program and the increase in benefits for the Traffic Enforcement Program. This change in allocation methodology does not impact the combined benefits of the two programs. There are a number of noteworthy observations that warrant some additional discussion.

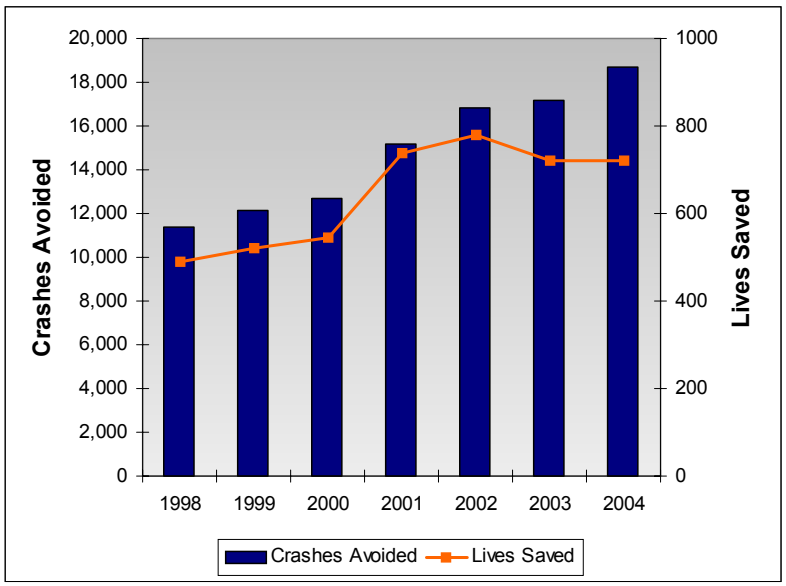

Figure ES-3. Crash and Fatality Trends

Program Activity Trends

While the activity data (i.e the number of roadside inspections and traffic enforcements) has remained relatively constant from 2002 to 2004, the number of crashes avoided each year has steadily increased over the same time period. Given the model's violation based approach, it is reasonable to conclude that the number of violations

cited has increased, the severity of the violations cited has increased, or both. Table ES-3 provides a breakdown of the number of violations cited by risk category and by year.

Table ES-3. Violations by Severity Level

Year	Number of Violations by Risk Category					Total
	1	2	3	4	5	
2000	212,077	2,418,214	1,563,475	669,206	553,613	5,416,585
2001	240,039	2,794,610	1,706,924	729,228	597,082	6,067,883
2002	266,765	3,099,164	1,849,608	830,586	662,399	6,708,522
2003	296,666	3,129,311	2,024,493	758,800	647,429	6,856,699
2004	308,392	3,248,926	2,145,652	786,715	610,623	7,100,308

The additional crashes avoided in 2003 appear to be a result of an increase in severity, with 11% and 9% increases in risk category 1 and 3 violations and only a 2% increase in total violations when compared to 2002 data. The additional 2004 crashes seem to be a result of an overall increase in violations with risk categories 1 through 4 increasing by around the same percentage as the total number of violations (approximately 4%) when compared with 2003 data.

Crash Severity Trends

While the number of crashes avoided has steadily increased over the past three years, the number of lives saved has decreased and remained unchanged from 2003 to 2004. The major reason for this behavior is the model relies on crash severity statistics from actual crashes reported during the activity year as described in the Methodology section of this document. Over the past few years the average number of fatal crashes and fatalities per crash have been decreasing according to MCMIS data. It is plausible that some of this decrease has resulted from increases in the safety of roads and vehicles. In the past few years, FMCSA has placed a greater emphasis on reporting injury and towaway crashes, which would also account for a decrease in the percentage of fatal crashes and subsequently the expected number of fatalities per crash. This is supported by the data shown in Table ES-4. Fatalities per crash and injuries per crash have been decreasing over the past 5 years with some noticeable declines in fatalities per crash from 2002 to 2003 and 2003 to 2004.

Table ES-4. Fatality and Injury Crash Statistics

Year	Fatalities / Crash	Injuries / Crash
2000	0.051	0.773
2001	0.047	0.744
2002	0.046	0.768
2003	0.040	0.753
2004	0.037	0.706

Program Level Reporting

In previous years the Roadside Inspection Program accounted for approximately three-fourths of the total crashes avoided and the Traffic Enforcement program accounted for approximately one-fourth of the total crashes avoided. In 2004, this allocation was approximately equal between the two programs. This change in distribution of crashes is the result of a change in the model methodology that was made for the 2004 analysis. Previously, the model would re-allocate the crashes avoided from roadside inspection violations found during the course of a traffic enforcement to the Roadside Inspection Program. This re-allocation procedure was removed from the model for the 2004 analysis as a result of a gradual shift in the implementation of the Traffic Enforcement Program.

Initially, the idea was to aggregate all of the crashes avoided from roadside inspection violations under the Roadside Inspection Program and similarly for the traffic enforcement violations since it was thought that the same group of roadside inspectors where used to perform the inspections under each program. Through discussions with states and FMCSA, it has become clear that in many cases the resources performing the traffic enforcements are also performing the roadside inspection component as well, and these resources are not shared with the Roadside Inspection Program. As a result of these findings, the methodology of the model has been modified. Now the Traffic Enforcement Program benefits include not only the traffic enforcement violations, but also the roadside inspection violations found subsequent to the traffic stop. There are numerous benefits to this change, the most significant of which is that the costs and benefits of each program can be separated and compared in order to make better decisions regarding resources.

Since the Traffic Enforcement Program benefits from the roadside violations as well as the traffic violations uncovered during a traffic stop, the model is capable of breaking out the benefits by each of those activities. Table ES-5 shows the benefits the Traffic Enforcement Program receives from traffic enforcement activities, roadside inspection activities, and the combined activities. The combined activities are a direct result of identifying additional violations during the same intervention. The model uses a multiplier to increase the number of crashes avoided above the mere sum of the crash risk probabilities of the violations found. Therefore, a combined intervention correcting roadside violations and traffic violations simultaneously will have a higher probability of preventing a crash than a single intervention correcting only traffic enforcement violations followed occasionally by a separate intervention correcting only the roadside violations.

Table ES-5. 2004 Traffic Enforcement Activity Level Results

	Crashes Avoided	Injuries Avoided	Lives Saved
Traffic Enforcement Activity	3,371	2,458	130
Roadside Inspection Activity	3,152	2,298	122
Combined Activity	2,544	1,855	99
Total	*9,067*	*6,611*	*351*

State Level

The model's flexibility lends itself to finer divisions of examination, such as scrutiny by state, which then can be used to guide the allocation of MCSAP resources and the design of state safety programs. Because many states manage their intervention program differently, it is also important to analyze state level totals as well as the national totals. The national totals have the ability to obscure state level trends that may occur because of the differences in how the programs are administered.

Table ES-6 through Table ES-8 provide detailed results for interventions conducted:

- in all fifty states,
- in the District of Columbia
- in American Samoa, Guam, and the Northern Mariana Islands (denoted by State of OT), and
- by federal staff (denoted by US).

These figures provide intervention counts, total estimated benefits (crashes avoided, lives saved, injuries avoided), and normalized estimated benefits (benefits per thousand interventions).

Table ES-6. 2004 Roadside Inspection and Traffic Enforcement Program Benefits

State	Total Initiating Interventions	Number with Violations	% of Total	Estimated Totals				Estimated Totals / 1000 Inspections			
				Crashes Avoided	Lives Saved	Injuries Avoided	Rank	Crashes Avoided	Lives Saved	Injuries Avoided	Rank
AK	8,141	4,187	51.4%	32.85	1.28	23.96	48	4.03	0.16	2.94	42
AL	28,421	24,726	87.0%	199.03	7.69	145.12	32	7.00	0.27	5.11	18
AR	49,843	37,276	74.8%	390.41	15.09	284.66	17	7.83	0.30	5.71	14
AZ	40,699	37,277	91.6%	727.26	28.10	530.28	5	17.87	0.69	13.03	1
CA	472,066	250,530	53.1%	933.68	36.07	680.80	2	1.98	0.08	1.44	52
CO	69,823	51,393	73.6%	446.29	17.25	325.42	15	6.39	0.25	4.66	21
CT	17,019	15,724	92.4%	232.15	8.97	169.27	29	13.64	0.53	9.95	4
DC	4,413	2,563	58.1%	17.99	0.70	13.13	52	4.08	0.16	2.97	41
DE	4,873	3,986	81.8%	28.91	1.12	21.09	49	5.93	0.23	4.33	27
FL	74,177	57,562	77.6%	498.81	19.28	363.71	12	6.72	0.26	4.90	19
GA	87,540	78,759	90.0%	897.33	34.66	654.30	3	10.25	0.40	7.47	10
HI	3,823	2,183	57.1%	24.54	0.96	17.89	50	6.42	0.25	4.68	20
IA	69,359	55,544	80.1%	222.32	8.60	162.10	30	3.21	0.12	2.34	49
ID	8,464	7,749	91.6%	118.07	4.57	86.09	37	13.95	0.54	10.17	3
IL	83,750	61,561	73.5%	385.79	14.91	281.29	19	4.61	0.18	3.36	37
IN	53,125	48,732	91.7%	385.90	14.92	281.38	18	7.26	0.28	5.30	17
KS	54,113	38,241	70.7%	215.26	8.31	156.96	31	3.98	0.15	2.90	43
KY	81,637	38,451	47.1%	286.21	11.07	208.70	26	3.51	0.14	2.56	47
LA	47,832	42,409	88.7%	267.03	10.32	194.71	27	5.58	0.22	4.07	28
MA	19,225	12,877	67.0%	115.30	4.47	84.09	38	6.00	0.23	4.37	26
MD	100,695	66,371	65.9%	477.70	18.46	348.32	14	4.74	0.18	3.46	34
ME	9,841	8,152	82.8%	73.12	2.84	53.31	42	7.43	0.29	5.42	16
MI	50,554	43,347	85.7%	445.79	17.23	325.04	16	8.82	0.34	6.43	13
MN	32,893	26,517	80.6%	513.56	19.85	374.47	10	15.61	0.60	11.38	2
MO	78,363	64,818	82.7%	894.24	34.56	652.04	4	11.41	0.44	8.32	6
MS	35,624	18,813	52.8%	166.44	6.43	121.36	33	4.67	0.18	3.41	35
MT	40,368	22,872	56.7%	148.69	5.74	108.43	34	3.68	0.14	2.69	45
NC	45,777	38,124	83.3%	243.13	9.40	177.29	28	5.31	0.21	3.87	31
ND	17,073	10,058	58.9%	43.47	1.69	31.70	46	2.55	0.10	1.86	51
NE	29,562	16,794	56.8%	128.05	4.95	93.37	36	4.33	0.17	3.16	39
NH	7,074	5,264	74.4%	45.13	1.75	32.90	45	6.38	0.25	4.65	23
NJ	31,645	26,502	83.7%	330.39	12.77	240.90	22	10.44	0.40	7.61	9
NM	77,570	60,359	77.8%	490.11	18.93	357.36	13	6.32	0.24	4.61	24
NV	23,512	15,670	66.6%	103.33	4.00	75.34	39	4.39	0.17	3.20	38
NY	108,301	67,557	62.4%	520.58	20.13	379.59	9	4.81	0.19	3.50	33
OH	73,939	60,688	82.1%	691.07	26.72	503.92	6	9.35	0.36	6.82	12
OK	14,835	11,832	79.8%	92.88	3.60	67.71	41	6.26	0.24	4.56	25
OR	54,401	41,209	75.8%	297.34	11.50	216.80	25	5.47	0.21	3.99	30
PA	83,142	66,082	79.5%	648.86	25.07	473.13	7	7.80	0.30	5.69	15
RI	3,153	2,521	80.0%	20.15	0.78	14.69	51	6.39	0.25	4.66	22
SC	32,968	25,314	76.8%	135.75	5.25	99.00	35	4.12	0.16	3.00	40
SD	25,158	15,130	60.1%	66.08	2.56	48.18	43	2.63	0.10	1.91	50
TN	70,782	44,322	62.6%	327.04	12.64	238.46	23	4.62	0.18	3.37	36
TX	291,424	255,576	87.7%	3,072.49	118.71	2,240.34	1	10.54	0.41	7.69	8
US	110,760	83,063	75.0%	359.87	13.91	262.39	20	3.25	0.13	2.37	48
UT	27,513	20,128	73.2%	304.05	11.75	221.71	24	11.05	0.43	8.06	7
VA	35,453	27,554	77.7%	340.71	13.18	248.43	21	9.61	0.37	7.01	11
VT	7,406	6,466	87.3%	41.16	1.60	30.00	47	5.56	0.22	4.05	29
WA	137,000	104,914	76.6%	528.02	20.40	385.00	8	3.85	0.15	2.81	44
WI	41,486	36,642	88.3%	510.32	19.72	372.09	11	12.30	0.48	8.97	5
WV	17,071	10,824	63.4%	61.38	2.38	44.76	44	3.60	0.14	2.62	46
WY	18,676	12,630	67.6%	96.69	3.74	70.51	40	5.18	0.20	3.78	32
OT	2,545	1,941	76.3%	30.00	1.16	21.88		11.79	0.46	8.60	
Total	**3,014,907**	**2,189,784**	**72.6%**	**18,672.69**	**721.74**	**13,615.38**		**6.19**	**0.24**	**4.52**	

Table ES-7. 2004 Roadside Inspection Program Benefits

State	Total Initiating Interventions	Roadside Inspections				Estimated Totals				Estimated Totals / 1000 Inspections			
		Number	% of Total	# with DR/VH	% of Total	Crashes Avoided	Lives Saved	Injuries Avoided	Rank	Crashes Avoided	Lives Saved	Injuries Avoided	Rank
AK	8,141	6,815	83.7%	2,861	35.1%	14.86	0.58	10.84	47	2.18	0.09	1.59	45
AL	28,421	18,817	66.2%	15,122	53.2%	79.40	3.07	57.90	32	4.22	0.16	3.08	21
AR	49,843	33,817	67.8%	21,250	42.6%	176.57	6.82	128.75	16	5.22	0.20	3.81	13
AZ	40,699	21,602	53.1%	18,180	44.7%	200.33	7.75	146.07	15	9.27	0.36	6.76	3
CA	472,066	371,672	78.7%	150,136	31.8%	429.84	16.61	313.42	2	1.16	0.04	0.84	52
CO	69,823	56,688	81.2%	38,258	54.8%	333.77	12.89	243.37	7	5.89	0.23	4.29	11
CT	17,019	10,927	64.2%	9,632	56.6%	95.57	3.69	69.68	29	8.75	0.34	6.38	4
DC	4,413	3,362	76.2%	1,512	34.3%	9.89	0.38	7.22	50	2.94	0.11	2.15	36
DE	4,873	3,135	64.3%	2,248	46.1%	11.74	0.45	8.57	49	3.75	0.14	2.73	26
FL	74,177	49,911	67.3%	33,296	44.9%	216.91	8.38	158.16	14	4.35	0.17	3.17	18
GA	87,540	59,665	68.2%	50,884	58.1%	419.05	16.18	305.55	3	7.02	0.27	5.12	6
HI	3,823	2,902	75.9%	1,262	33.0%	4.60	0.19	3.36	52	1.59	0.06	1.16	50
IA	69,359	55,890	80.6%	42,075	60.7%	151.39	5.86	110.39	20	2.71	0.10	1.98	39
ID	8,464	4,720	55.8%	4,005	47.3%	36.56	1.41	26.66	39	7.75	0.30	5.65	5
IL	83,750	49,424	59.0%	27,235	32.5%	103.29	3.99	75.31	27	2.09	0.08	1.52	47
IN	53,125	22,655	42.6%	18,262	34.4%	98.84	3.82	72.06	28	4.36	0.17	3.18	16
KS	54,113	37,431	69.2%	21,559	39.8%	87.39	3.37	63.72	30	2.33	0.09	1.70	43
KY	81,637	68,590	84.0%	25,404	31.1%	228.31	8.83	166.48	13	3.33	0.13	2.43	30
LA	47,832	21,829	45.6%	16,406	34.3%	53.17	2.05	38.77	35	2.44	0.09	1.78	42
MA	19,225	12,231	63.6%	5,883	30.6%	33.04	1.28	24.10	40	2.70	0.10	1.97	40
MD	100,695	80,099	79.5%	45,775	45.5%	245.62	9.49	179.10	12	3.07	0.12	2.24	35
ME	9,841	7,133	72.5%	5,444	55.3%	31.03	1.20	22.62	41	4.35	0.17	3.17	17
MI	50,554	21,793	43.1%	14,586	28.9%	122.56	4.73	89.36	23	5.62	0.22	4.10	12
MN	32,893	16,537	50.3%	10,161	30.9%	68.81	2.66	50.18	34	4.16	0.16	3.03	22
MO	78,363	47,929	61.2%	34,384	43.9%	301.65	11.66	219.95	9	6.29	0.24	4.59	8
MS	35,624	34,816	97.7%	18,005	50.5%	141.86	5.49	103.44	21	4.07	0.16	2.97	24
MT	40,368	35,033	86.8%	17,537	43.4%	110.95	4.28	80.91	24	3.17	0.12	2.31	33
NC	45,777	32,733	71.5%	25,080	54.8%	108.91	4.22	79.41	25	3.33	0.13	2.43	31
ND	17,073	13,310	78.0%	6,295	36.9%	26.91	1.04	19.62	43	2.02	0.08	1.47	48
NE	29,562	24,554	83.1%	11,786	39.9%	103.70	4.01	75.62	26	4.22	0.16	3.08	20
NH	7,074	5,163	73.0%	3,353	47.4%	20.34	0.79	14.82	46	3.94	0.15	2.87	25
NJ	31,645	19,204	60.7%	14,061	44.4%	79.61	3.08	58.05	31	4.15	0.16	3.02	23
NM	77,570	55,101	71.0%	37,890	48.8%	253.39	9.78	184.75	11	4.60	0.18	3.35	15
NV	23,512	18,694	79.5%	10,852	46.2%	48.50	1.88	35.36	37	2.59	0.10	1.89	41
NY	108,301	90,809	83.8%	50,065	46.2%	259.94	10.05	189.54	10	2.86	0.11	2.09	37
OH	73,939	57,056	77.2%	43,805	59.2%	361.83	13.99	263.84	5	6.34	0.25	4.62	7
OK	14,835	7,312	49.3%	4,309	29.0%	23.91	0.93	17.43	45	3.27	0.13	2.38	32
OR	54,401	40,138	73.8%	26,946	49.5%	170.46	6.60	124.29	17	4.25	0.16	3.10	19
PA	83,142	64,733	77.9%	47,673	57.3%	302.57	11.69	220.63	8	4.67	0.18	3.41	14
RI	3,153	1,927	61.1%	1,295	41.1%	6.82	0.26	4.97	51	3.54	0.14	2.58	28
SC	32,968	15,619	47.4%	7,965	24.2%	42.54	1.64	31.02	38	2.72	0.10	1.99	38
SD	25,158	18,604	73.9%	8,576	34.1%	26.54	1.03	19.34	44	1.43	0.06	1.04	51
TN	70,782	40,479	57.2%	14,019	19.8%	77.67	3.00	56.63	33	1.92	0.07	1.40	49
TX	291,424	248,317	85.2%	212,469	72.9%	2,575.20	99.50	1,877.73	1	10.37	0.40	7.56	2
US	110,760	108,710	98.1%	81,013	73.1%	336.64	13.01	245.46	6	3.10	0.12	2.26	34
UT	27,513	21,380	77.7%	13,995	50.9%	132.99	5.14	96.97	22	6.22	0.24	4.54	9
VA	35,453	26,226	74.0%	18,327	51.7%	155.92	6.03	113.69	19	5.95	0.23	4.33	10
VT	7,406	4,321	58.3%	3,381	45.7%	14.53	0.57	10.59	48	3.36	0.13	2.45	29
WA	137,000	79,745	58.2%	47,659	34.8%	168.12	6.49	122.58	18	2.11	0.08	1.54	46
WI	41,486	33,692	81.2%	28,848	69.5%	398.53	15.40	290.59	4	11.83	0.46	8.62	1
WV	17,071	12,255	71.8%	6,008	35.2%	27.38	1.06	19.97	42	2.23	0.09	1.63	44
WY	18,676	14,027	75.1%	7,981	42.7%	51.70	2.00	37.70	36	3.69	0.14	2.69	27
OT	2,545	2,343	92.1%	1,739	68.3%	24.49	0.95	17.85		10.45	0.41	7.62	
Total	**3,014,907**	**2,211,875**	**73.4%**	**1,386,752**	**46.0%**	**9,606.12**	**371.28**	**7,004.38**		**4.34**	**0.17**	**3.17**	

Table ES-8. 2004 Traffic Enforcement Benefits

State	Total Initiating Interventions	Traffic Enforcements		Program Estimated Totals				Estimated Totals / 1000 Inspections			
		Number	% of Total	Crashes Avoided	Lives Saved	Injuries Avoided	Rank	Crashes Avoided	Lives Saved	Injuries Avoided	Rank
AK	8,141	1,326	16.3%	17.98	0.70	13.11	48	13.56	0.53	9.89	17
AL	28,421	9,604	33.8%	119.63	4.62	87.22	27	12.46	0.48	9.08	20
AR	49,843	16,026	32.2%	213.84	8.27	155.91	20	13.34	0.52	9.73	18
AZ	40,699	19,097	46.9%	526.93	20.36	384.21	2	27.59	1.07	20.12	3
CA	472,066	100,394	21.3%	503.84	19.47	367.38	3	5.02	0.19	3.66	49
CO	69,823	13,135	18.8%	112.52	4.36	82.05	28	8.57	0.33	6.25	37
CT	17,019	6,092	35.8%	136.58	5.28	99.59	23	22.42	0.87	16.35	5
DC	4,413	1,051	23.8%	8.10	0.32	5.91	52	7.71	0.30	5.62	41
DE	4,873	1,738	35.7%	17.17	0.67	12.52	49	9.88	0.38	7.20	31
FL	74,177	24,266	32.7%	281.90	10.90	205.55	13	11.62	0.45	8.47	22
GA	87,540	27,875	31.8%	478.28	18.47	348.74	5	17.16	0.66	12.51	13
HI	3,823	921	24.1%	19.93	0.77	14.53	47	21.64	0.84	15.77	7
IA	69,359	13,469	19.4%	70.92	2.74	51.71	33	5.27	0.20	3.84	48
ID	8,464	3,744	44.2%	81.51	3.15	59.43	32	21.77	0.84	15.87	6
IL	83,750	34,326	41.0%	282.49	10.92	205.98	12	8.23	0.32	6.00	38
IN	53,125	30,470	57.4%	287.06	11.09	209.32	11	9.42	0.36	6.87	33
KS	54,113	16,682	30.8%	127.88	4.94	93.24	25	7.67	0.30	5.59	42
KY	81,637	13,047	16.0%	57.90	2.24	42.22	35	4.44	0.17	3.24	51
LA	47,832	26,003	54.4%	213.86	8.27	155.94	19	8.22	0.32	6.00	40
MA	19,225	6,994	36.4%	82.26	3.19	59.99	31	11.76	0.46	8.58	21
MD	100,695	20,596	20.5%	232.08	8.97	169.23	18	11.27	0.44	8.22	26
ME	9,841	2,708	27.5%	42.09	1.63	30.69	38	15.54	0.60	11.33	14
MI	50,554	28,761	56.9%	323.23	12.50	235.69	10	11.24	0.43	8.19	27
MN	32,893	16,356	49.7%	444.75	17.19	324.29	6	27.19	1.05	19.83	4
MO	78,363	30,434	38.8%	592.58	22.90	432.09	1	19.47	0.75	14.20	11
MS	35,624	808	2.3%	24.58	0.95	17.93	44	30.42	1.17	22.19	1
MT	40,368	5,335	13.2%	37.74	1.46	27.53	40	7.07	0.27	5.16	43
NC	45,777	13,044	28.5%	134.22	5.19	97.87	24	10.29	0.40	7.50	30
ND	17,073	3,763	22.0%	16.56	0.64	12.08	50	4.40	0.17	3.21	52
NE	29,562	5,008	16.9%	24.35	0.95	17.75	45	4.86	0.19	3.54	50
NH	7,074	1,911	27.0%	24.79	0.96	18.08	43	12.97	0.50	9.46	19
NJ	31,645	12,441	39.3%	250.78	9.69	182.86	15	20.16	0.78	14.70	8
NM	77,570	22,469	29.0%	236.72	9.14	172.60	17	10.54	0.41	7.68	29
NV	23,512	4,818	20.5%	54.83	2.13	39.99	36	11.38	0.44	8.30	24
NY	108,301	17,492	16.2%	260.64	10.08	190.05	14	14.90	0.58	10.86	15
OH	73,939	16,883	22.8%	329.24	12.73	240.08	9	19.50	0.75	14.22	10
OK	14,835	7,523	50.7%	68.97	2.67	50.29	34	9.17	0.36	6.68	34
OR	54,401	14,263	26.2%	126.88	4.90	92.51	26	8.90	0.34	6.49	35
PA	83,142	18,409	22.1%	346.29	13.38	252.50	8	18.81	0.73	13.72	12
RI	3,153	1,226	38.9%	13.32	0.51	9.72	51	10.87	0.42	7.93	28
SC	32,968	17,349	52.6%	93.21	3.61	67.98	30	5.37	0.21	3.92	47
SD	25,158	6,554	26.1%	39.54	1.53	28.83	39	6.03	0.23	4.40	46
TN	70,782	30,303	42.8%	249.38	9.63	181.83	16	8.23	0.32	6.00	39
TX	291,424	43,107	14.8%	497.29	19.21	362.61	4	11.54	0.45	8.41	23
US	110,760	2,050	1.9%	23.23	0.90	16.93	46	11.33	0.44	8.26	25
UT	27,513	6,133	22.3%	171.06	6.61	124.73	22	27.89	1.08	20.34	2
VA	35,453	9,227	26.0%	184.80	7.15	134.74	21	20.03	0.77	14.60	9
VT	7,406	3,085	41.7%	26.63	1.03	19.41	42	8.63	0.33	6.29	36
WA	137,000	57,255	41.8%	359.90	13.91	262.42	7	6.29	0.24	4.58	45
WI	41,486	7,794	18.8%	111.78	4.32	81.50	29	14.34	0.55	10.46	16
WV	17,071	4,816	28.2%	34.00	1.32	24.79	41	7.06	0.27	5.15	44
WY	18,676	4,649	24.9%	45.00	1.74	32.82	37	9.68	0.37	7.06	32
OT	2,545	202	7.9%	5.51	0.21	4.03		27.28	1.04	19.95	
Total	**3,014,907**	**803,032**	**26.6%**	**9,066.56**	**350.46**	**6,611.00**		**11.29**	**0.44**	**8.23**	